

**WORLD METEOROLOGICAL ORGANIZATION**

**INTERGOVERNMENTAL OCEANOGRAPHIC  
COMMISSION (OF UNESCO)**

JOINT WMO/IOC TECHNICAL COMMISSION FOR  
OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)  
EXPERT TEAM ON MARINE CLIMATOLOGY

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FIRST SESSION

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## **REVIEW OF THE OPERATIONS OF THE GLOBAL COLLECTING CENTRES**

*(Submitted by the GCC United Kingdom and GCC Germany)*

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### **Summary and Purpose of Document**

This document contains the report of the Global Collecting Centres. The Team is invited to review the operation/activities of RM and identify any deficiencies and consider possible further improvements of the data exchange system.

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### **ACTION PROPOSED**

The Expert Team on Marine Climatology is invited to :

- (a) Review the operation/activities of the Global Collecting Centres ;
- (b) Identify any deficiencies and consider possible further improvements of the data exchange system.

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**Appendix:** GCC Annual Report 2003

## **DISCUSSION**

### **Introduction**

1. The Global Collecting Centres for the Marine Climatological Summaries Scheme have been established by Recommendation 11 (CMM-XI) (Lisbon, April 1993). Germany and the United Kingdom have been operating the GCCs. The current activities of the GCCs will be reported through the GCC annual report (Appendix A).

### **GCC report**

2. The GCC annual report of 2003 marks the 10th year of their operation.

3. 2003 represents an average year, with 1.1 million obs, and a near average number of contributing members (av.16). From the data submitted in 2003 more than three quarters of it was observed since 2000, and 99% since 1990. However, the older data also makes a valuable contribution to the database.

4. There are always a number of problems with the data for example duplicates, date / time and positional errors, data on land and data sparse areas. There are also a number of elements rarely reported.

5. The VOSclim Project began its operational phase, and approximately a third of submissions were made in IMMT-2 format. The GCCs began to process this data, but currently there is no quality control performed on these additional elements. [New IMMT / MQCS - recommended in a previous talk]

6. In 2002 the GCCs produced a MQC software programme for contributing members, to try and improve the quality of data being submitted. This Fortran code has been requested by 19 countries, and the first update was sent out to them in 2003.

### **Looking to the future**

7. The GCCs now focus more on the data management aspect of marine meteorological observations, as opposed to climatology. The frequency of the production of the Summaries has decreased from yearly to decadal, and probably most RMs produce them on an ad-hoc basis. This brings up the question of quality assurance, end-to-end data management (as discussed by the ETDMP) and storage issues, such as distributed systems, metadata, etc. For example; OPeNDAT / DODS (distributed oceanographic data system).

8. What is the potential value of including climate data and metadata within one data base system, or should we keep a distributed system. If a distributed system remains, do we need to regulate the higher levels of quality control (so the same data is not stored as different versions around the world, with no way of recognizing it originated from the same data), or tag the data in some way?

9. The MCSS was set up for the climatological monitoring of the worlds oceans, by 8 responsible members, and to do this they all stored the data for their relevant areas to be able to produce these charts and tables.

10. With the set up of the GCCs and the majority of the RMs storing all the global data what is the requirement for the availability of these Summaries?

**Action proposed**

11. The Expert Team on Marine Climatology is invited to review the operation/activities of the Global Collecting Centres and identify any deficiencies and consider possible further improvements of the data exchange system.

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Appendix: 1

**GLOBAL COLLECTING CENTRES FOR MARINE CLIMATOLOGICAL DATA**  
**ANNUAL REPORT - 2003**

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GCCs started their operation in 1994 according to Rec. 11, CMM-XI and Resol. 10, EC-XLV 1993, as a result of the revised MCSS. This had the goal of simplifying, improving the quality and accelerating the data flow within the scheme. The contributions by members should be made quarterly. It is the responsibility of each GCC to check if the minimum control procedures have been applied and then to dispatch a copy of all the quality controlled data, collected from Contributing Members, to the remaining Responsible Members, also on a quarterly basis. The GCCs are expected to work in close co-operation, applying identical principles and being able to continue the total dataflow in the scheme, even in the case of possible failure of one of them. This 2003 report marks the 10<sup>th</sup> year of operation.

**Data Contributions 2003**

In 2003, the total amount of data collected was about 1,1 million observations (**Table 1**). The contributions came from 17 countries, which represents less than one third of all potential Contributing Members.

A history of the volume of data supplied the last 10 years is shown in **Fig. 1**. The numbers sometimes differ significantly from year to year, due to the fact that big data volumes are delayed and provided in the following year.

This behaviour becomes more evident looking at the figures considering non-duplicate data only (**Fig. 2**), though the numbers in 2003 do not differ much from those numbers of the unique observations in 2002.

Three countries sent data from recruited VOSclim ships to the GCCs, but only one country contributed observations with the additional variables. Some ships added the VOSclim messages at the end of their observations, although they are not a recruited VOSclim ship.

The distribution of observing periods within the 2003 contributions shows data originating from as early as 1988, this can be seen in **Fig.3** and **Fig.4**. About 68% of data were not older than 2001 and 56% less than 2 years old. The percentage of old data is small, but though delayed, represents a valuable addition to the global database. The number of data sets received per month still varied greatly as shown in **Fig.5**. The majority of countries contributed on a quarterly basis, with just a few contributing annually.

The areal distribution (**Fig.6**) reflects, as always, the main shipping lanes between continents, with data concentrated near the coasts. There were still erroneous data with land positions, this should be considered by the Contributing Members, although numbers showed a slight improvement.

<sup>1</sup> <http://www.dwd.de/en/Funde/Klima/KLIS/int/GCC/GCC.htm>

### **Data Processing**

1. The received data were in IMMT format (2/3 IMMT-1, but 1/3 already in IMMT-2 format). Some contributors still continued the mistaken practice of coding "/" or "-" for "missing data" (as in FM13) rather than the blank required by IMMT.
2. As before, the GCCs corrected, where possible, simple errors in organizational data (elements 2-8, 42: date/time, position and identifier) normally after consultation with contributors. Correct values of these data are essential for any successful archival and retrieval. Correct positioning still seems to be an issue to be considered by the Contributing Members.
3. Subsequent processing checked the data consistency by applying the WMO Minimum Quality Control (MQC) standards. Flags were set by the GCC MQC procedure where a quality control query was raised, especially when the original data were without any flag information. The proportion of data sets that required this action decreased slightly to about 4% (2002: 5%). The existing flags in the remaining reports were checked and corrected where necessary as described in the 1994 report.
4. Most data were exchanged by e-mail. If appropriate the transfer was also achieved by anonymous ftp. Floppy disk is of course accepted, or any transfer medium bilaterally agreed between contributor and GCCs.

### **Errors**

The general error rate increased to 0.3% in 2003 (occasions where flagging by national quality control was inconsistent with GCC MQC control). No particular type of error dominated. Duplicate data from one source still occurred and had to be rejected due to bilateral consultation.

Some records with uncorrectable errors had to be rejected, in particular those having an invalid date or time or distance inconsistency. Rejected data were placed to a "dregs" datafile which accompanies the collective of good data, dispatched quarterly to the Responsible Members. GCCs found these to be about 0.1% in 2003 which mostly came from duplicate data.

There was also some evidence of rarely reported elements (**Fig. 7**), though for most of the parameters there was no significant change or improvement, and it seems more as if the percentage of missing elements is rising.

Detailed bilateral correspondence was conducted with 11 countries on the improvement of data quality and resolving of problems.

### **Dispatch of Data**

During the reporting period four data collectives were dispatched to Responsible Members at the end of each quarter and the selected VOSclim data were provided as subset to the DAC (Data Acquisition Center) in Asheville/USA. (**Fig. 8**)

The dispatched data comprised of three files, as usual; the first holding all those reports which passed MQC successfully, the second those which were rejected because of errors in organizational information and the third holding information on rejected observations. It is up to each Responsible Member to decide how to proceed with these data, either ignoring or correcting the "dregs".

## Developments

The VOSCLIM Project started its operational phase. The GCCs therefore had to conform to the IMMT-2 format, which allows for additional parameters, introduced through this project and adopted by JCOMM-I, June 2001. Although there are presently no minimum quality criteria for these parameters the GCCs are able to process the VOSCLIM data as part of the general processing line.

GCCs continued working on the MQC criteria, developing some small revisions and additional updates to be proposed to the ETMC at its next session in 2004. There will also be MQC criteria proposed for the VOSCLIM additional parameters for discussion at ETMC.

This year the first revision of the MQC-program was sent to the 19 countries who have requested the software, there were some minor changes made, and now include a check for invalid characters in the VOSCLIM additional fields columns. The next update, with the checking for the VOSCLIM additional elements, will be made in the near future.

## Summary

Most contributors are applying MQC or other kinds of advanced quality control before sending their data to the GCCs. Best results can be achieved if data are corrected, instead of being flagged as "doubtful" or "erroneous". This can be done most competently by the Contributing Members themselves. A good preventive tool may be the results of the quality monitoring activities by WMO and UK, or the use of an automatic system which provides immediate minimum quality checks just after the composition of an observation. Avoiding errors at the origin appears to be the best strategy for the improvement of quality.

Two tools are available: 1. Electronic journal software can be ordered from WMO or KNMI, The Netherlands. 2. A consolidated MQC-software is offered by GCCs.

Members are encouraged to improve the steadiness of their contributions where applicable and to realize the quarterly cycle of the data flow to enable the archives to respond to the needs of the climatological user community for timely and complete marine climate data.

GCCs invite all members to provide further feedback, as well as data, for the benefit of the whole system and the integrity of the marine database.

## Abbreviations

<b>CMM</b>	Commission for Marine Climatology
<b>DAC</b>	Data Acquisition Center (NCDC, NOAA –VOSCLIM Project Data Centre)
<b>EC</b>	Executive Council of WMO
<b>ETMC</b>	Expert Team on Marine Climatology (JCOMM)
<b>FM 13-X SHIP</b>	Code Form (numbering system of code forms) (FM also Form of Message)
<b>GCC</b>	Global Collecting Centre (MCSS / JCOMM)
<b>IMMT</b>	International Maritime Meteorological Tape
<b>JCOMM</b>	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
<b>KNMI</b>	Koninklijk Nederlands Meteorologisch Instituut
<b>MCSS</b>	Marine Climatological Summaries Scheme (JCOMM)
<b>MQC</b>	Minimum Quality Control (WMO Standard)
<b>UK</b>	United Kingdom
<b>VOS</b>	Voluntary Observing Ship
<b>VOSCLIM</b>	VOS Climate (Subset for High Quality Data - Project)
<b>WMO</b>	World Meteorological Organization

Country Name	ISO Alpha-2 code	Number of observations
Argentina	AR	436
Australia	AU	46190
France	FR	16269
Germany	DE	450384
Hong Kong, China	HK	2011
Israel	IL	9523
India	IN	12084
Japan	JP	70063
Malaysia	MY	6711
Netherlands	NL	134889
Norway	NO	30263
Poland	PL	2603
Russian Federation	RU	104938
Singapore	SG	1706
South Africa	ZA	2202
United Kingdom	GB	88874
United States	US	99372
<b>Total 2003</b>		1078518

Table 1

**Figure 1**  
**Yearly Contributions 1994 - 2003**

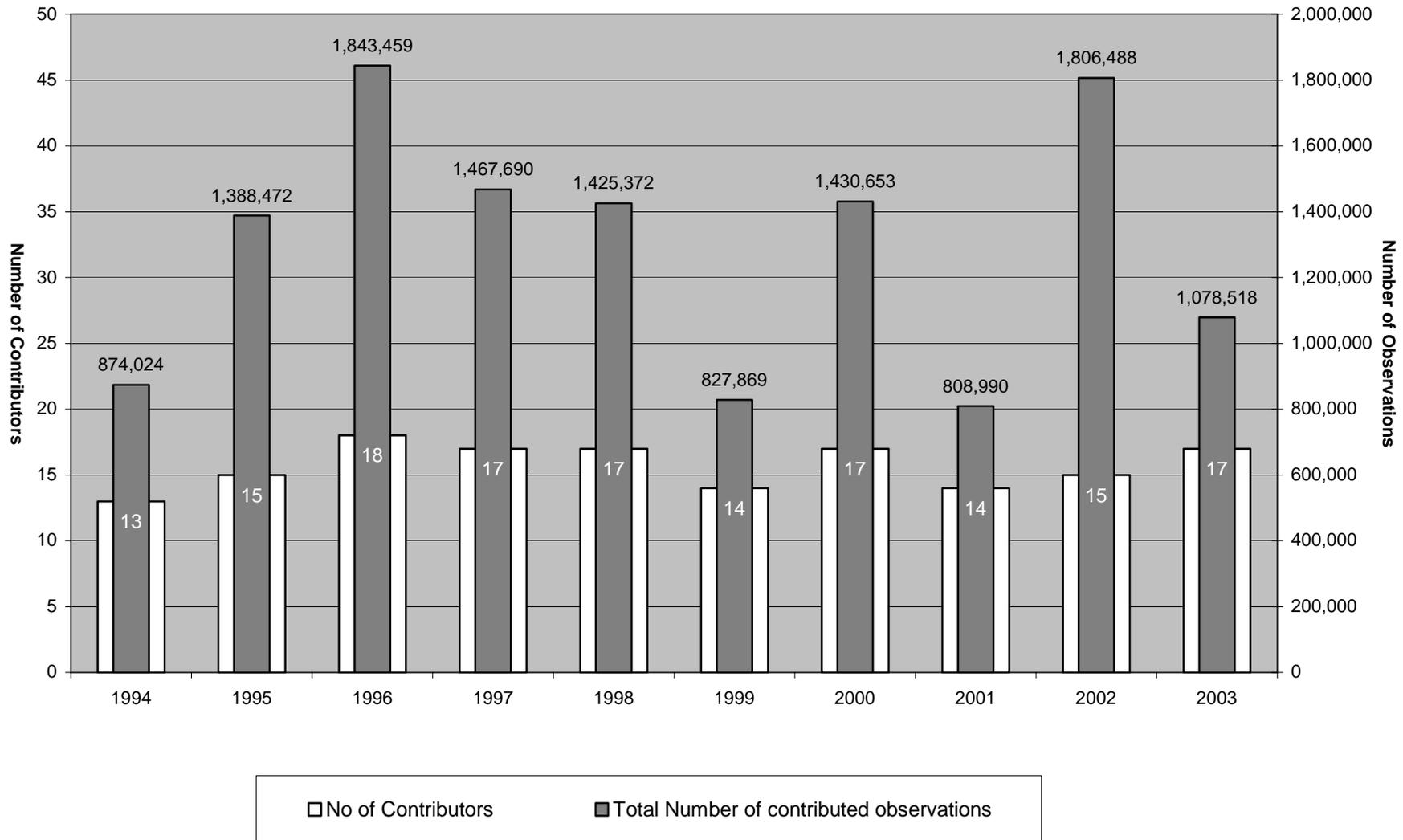
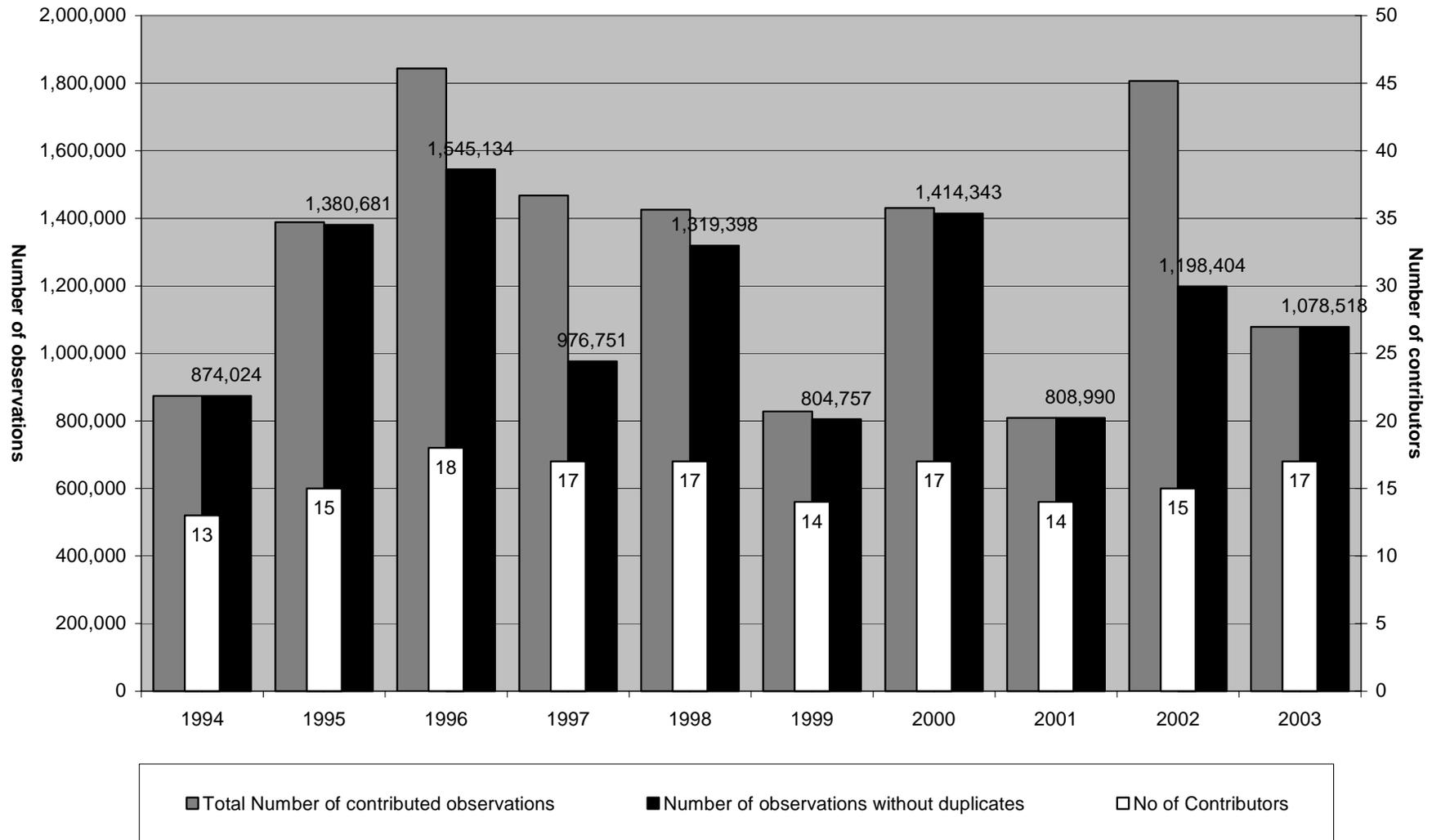
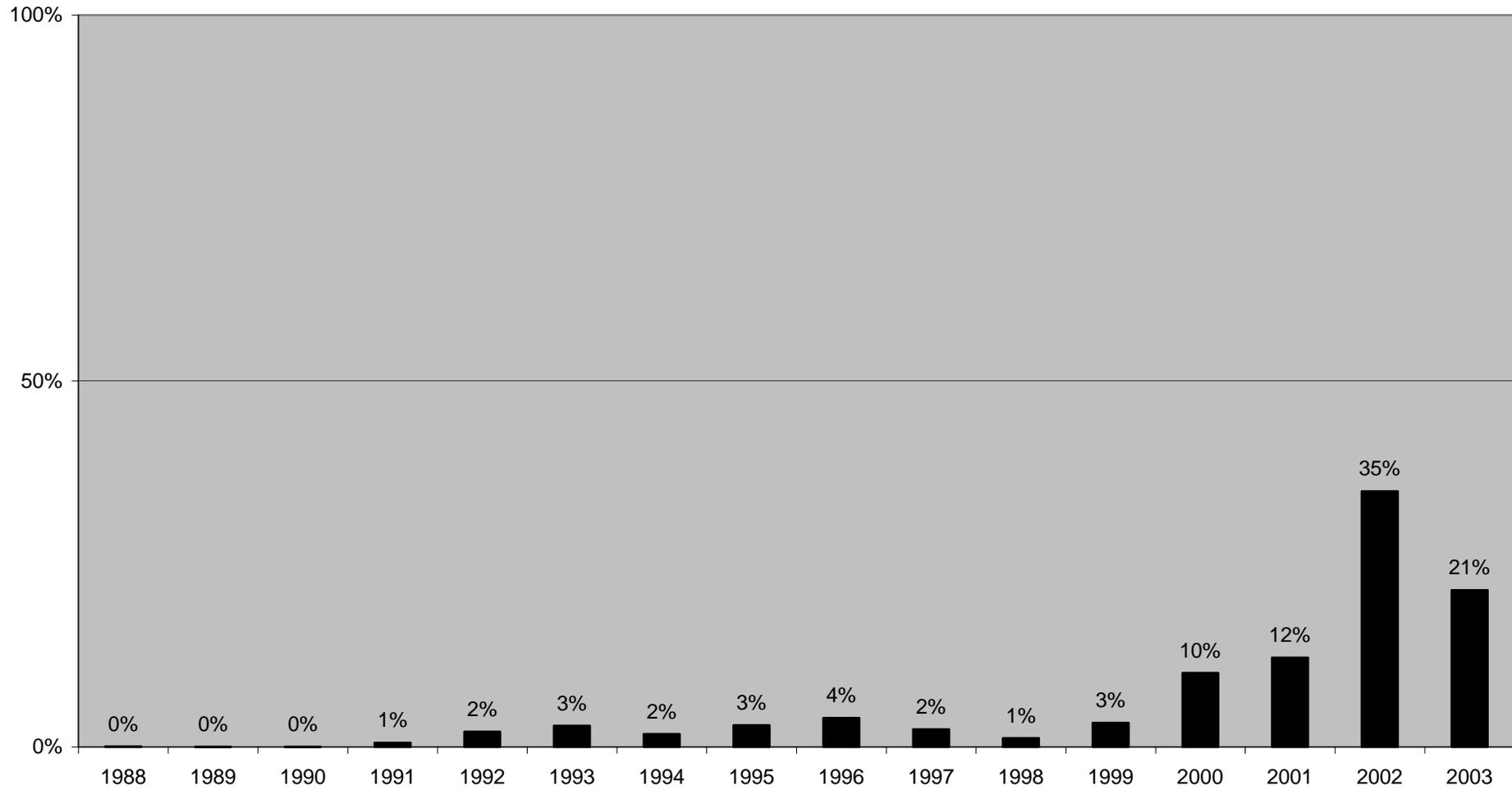


Figure 2



**Figure 3**  
**INPUT 2003**





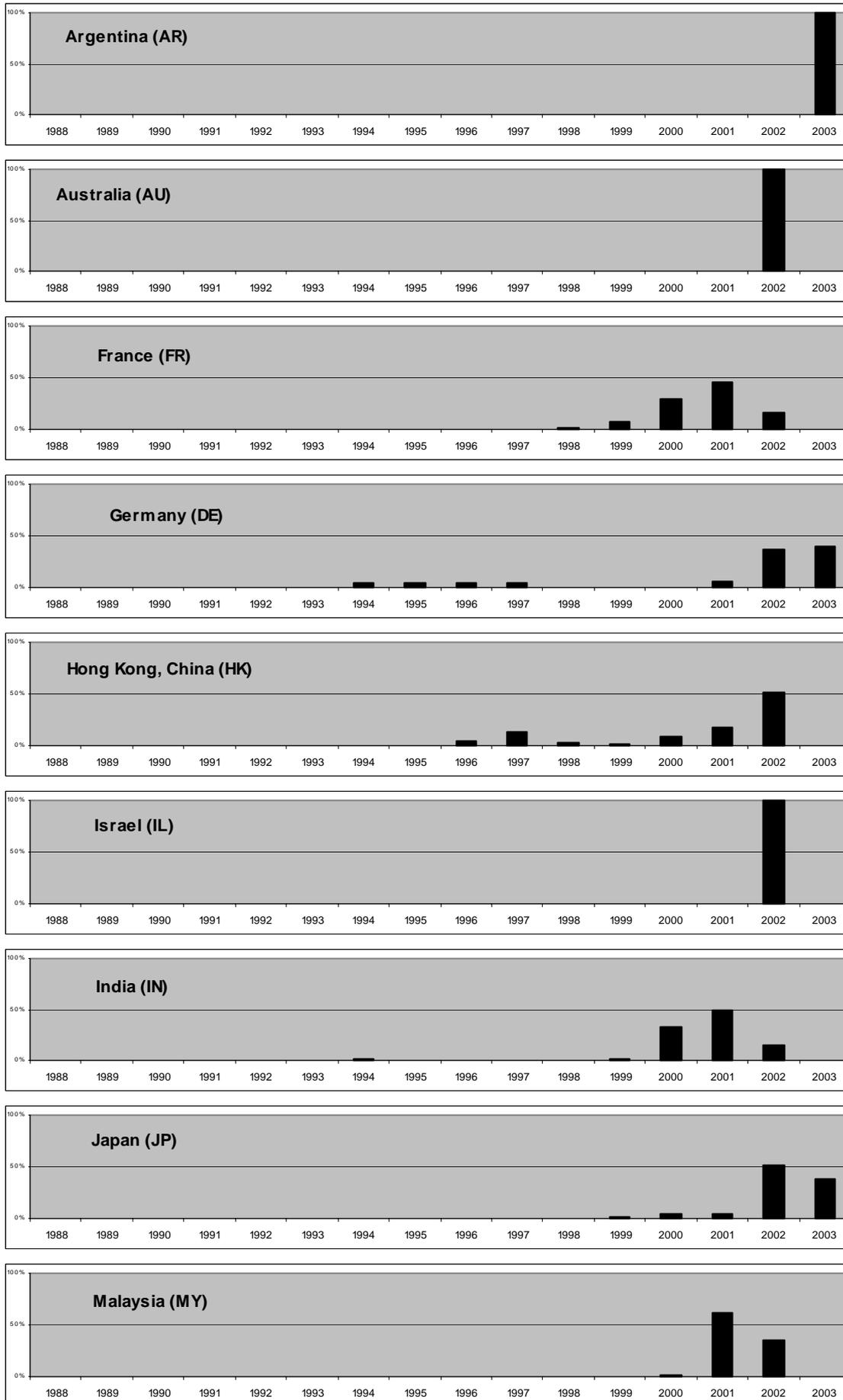


Figure 4

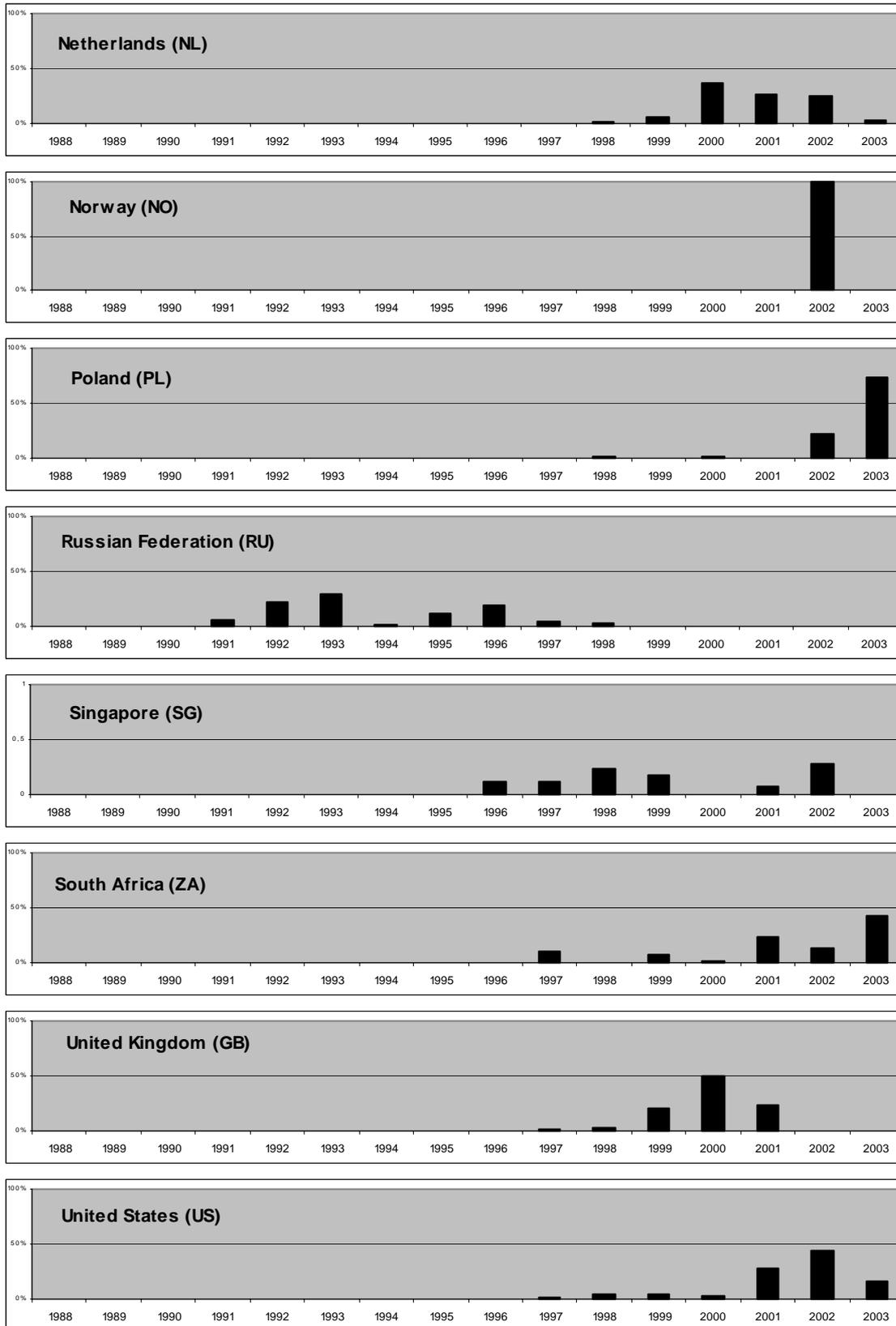


Figure 4 cont.

### GCC - Input 2003

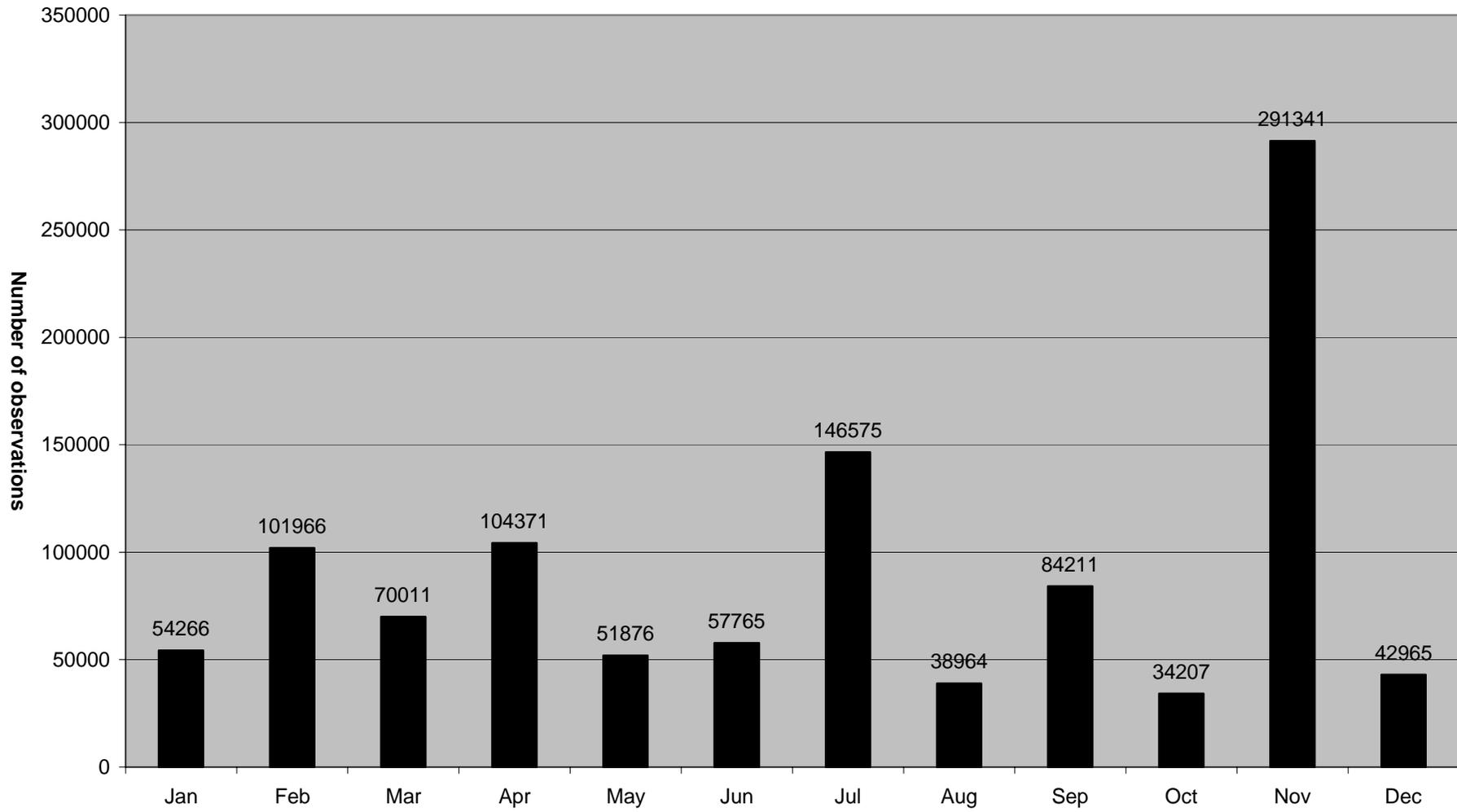
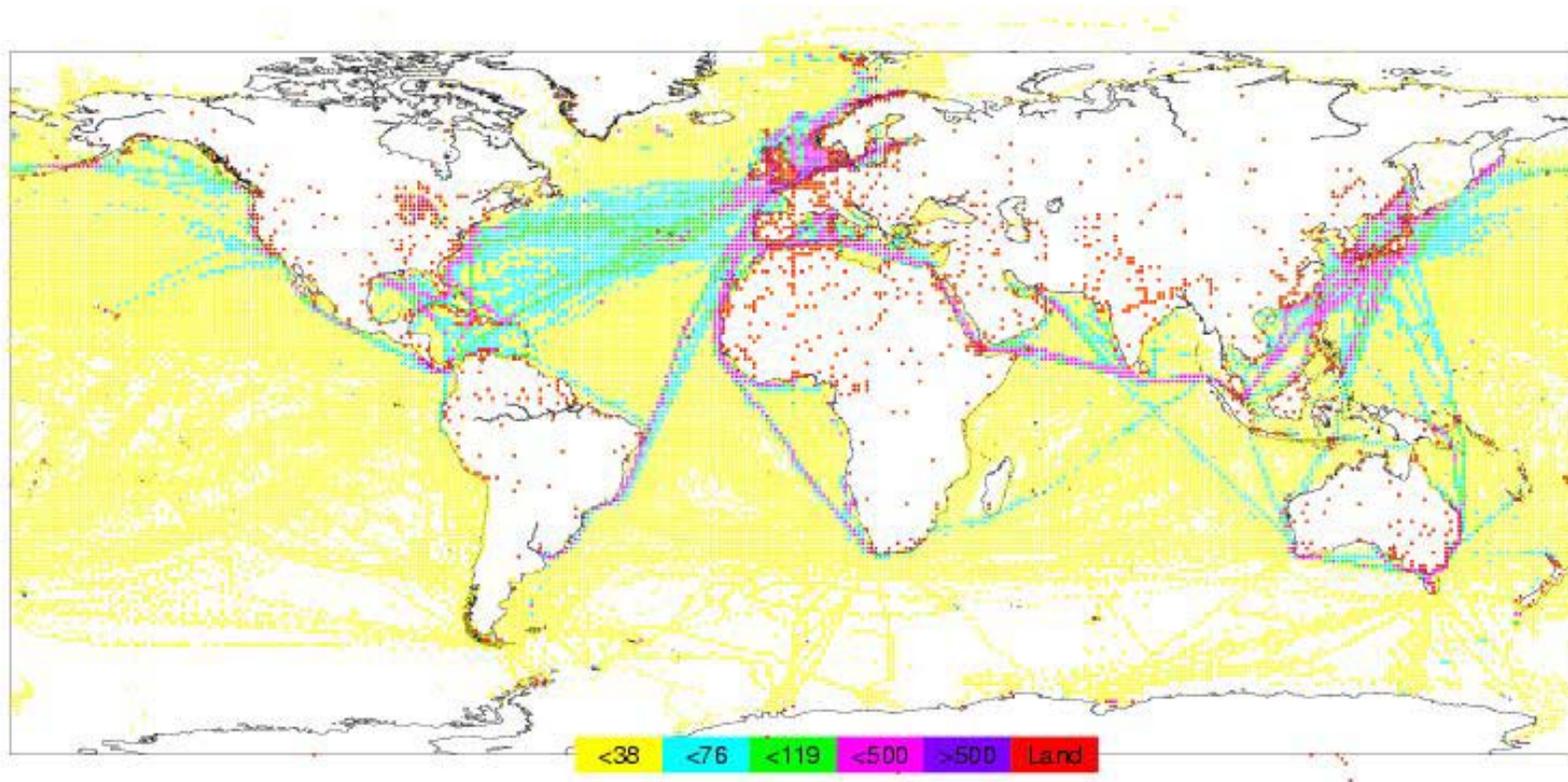


Figure 5



Area distribution

Total number of observations (1078515) received in 2003

Figure 6

**Elements reported "blank"**

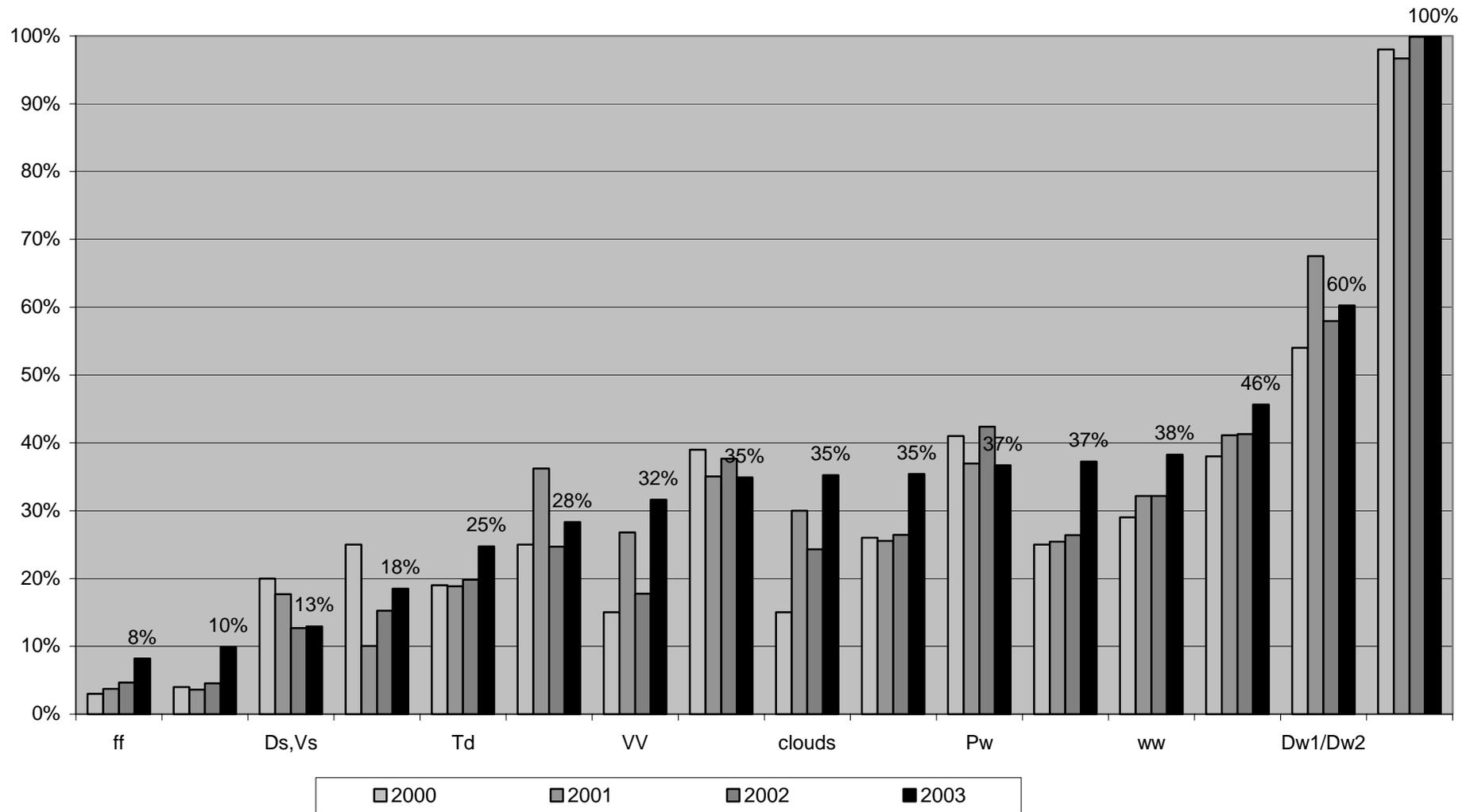


Figure 7

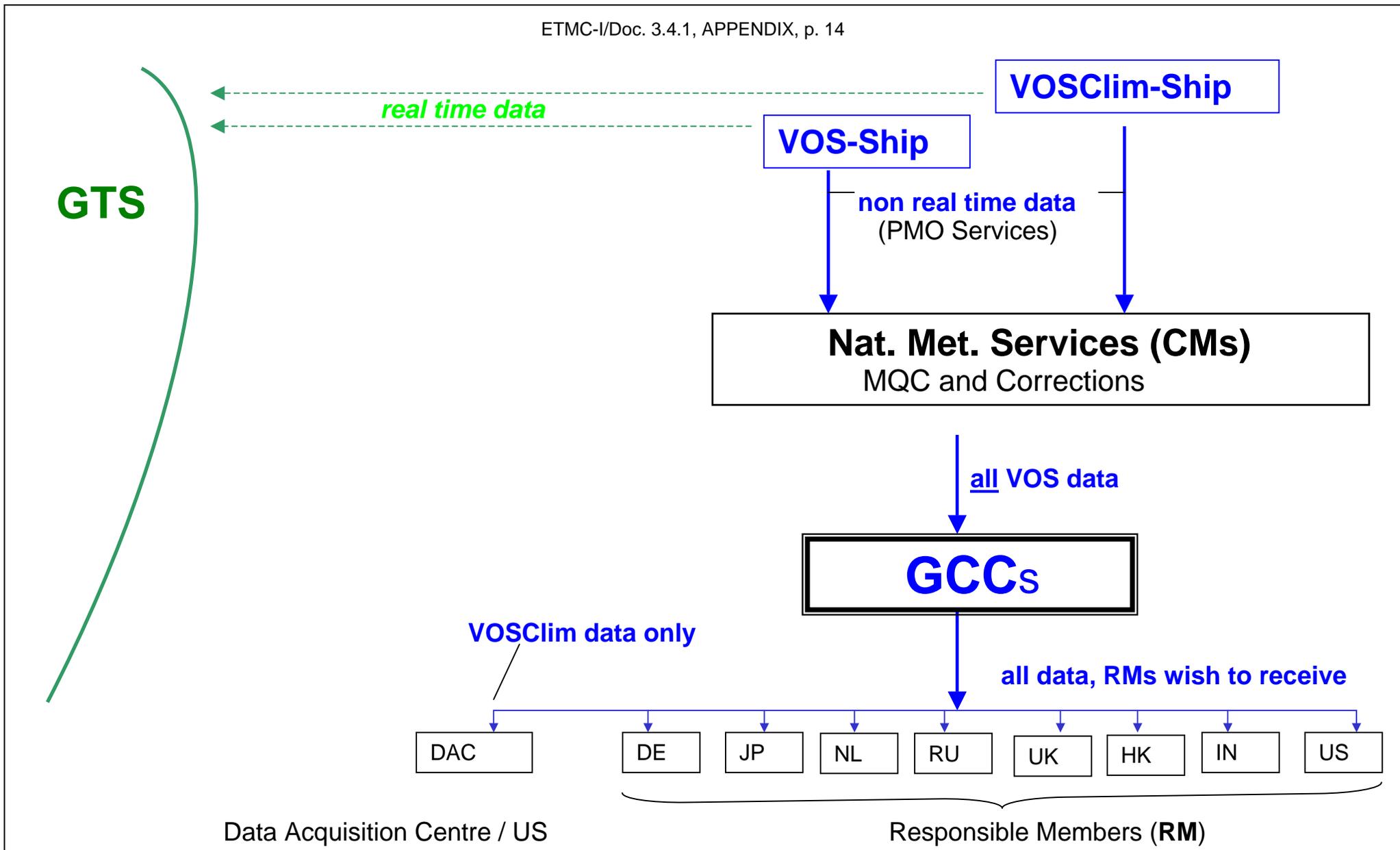


Fig. 8: Data flow (non real time) within MCSS